

David View

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April 2013

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THE WEEKLY



For Good Measure

The need for measuring the when and where and how much of precipitation goes beyond our weekend plans. We also need to know precipitation on a global scale. The GPM constellation will cover the globe and give us a more comprehensive look at precipitation. Click on the image for more.

Antares Launch Reschedule

The next probable attempt to test launch its Antares rocket from NASA's Wallops Flight Facility will be no earlier than Friday, April 19, at 5 p.m. EDT. [NASA Television](#) will begin live coverage of the second launch attempt beginning at 4:30 p.m. Click the image to learn more.



NASA FY 2014 Video

Goddard is heavily represented in the agency's FY 2014 video. Interviews of Goddard researchers Ed Rezac, Jane Marquart, Amber Straughn, and Jared Espley were featured, as were clips of several Goddard visualizations and other video products.

Webb NIRSpec and Microshutters

Installing equipment into the Webb Telescope requires patience and precision. To prepare for the installation of the actual flight equipment, scientists need to practice with an identical test unit. Scientists at Goddard are currently rehearsing with the placement of the Webb's Microshutter Array into the NIRSpec.



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On the cover: Center Director Chris Scolese greets Sen. Ben Cardin on his arrival at Goddard.

Photo credit: NASA/Goddard/Bill Hrybyk

GoddardView

Goddard View is an official publication of NASA's Goddard Space Flight Center. *Goddard View* showcases people and achievements in the Goddard community that support Goddard's mission to explore, discover, and understand our dynamic universe. [Goddard View](#) is published weekly by the Office of Communications.

News items for publication in *Goddard View* must be received by noon Wednesday of each week. You may submit contributions to the editor via e-mail at john.m.putman@nasa.gov. Ideas for new stories are welcome but will be published as space allows. All submissions are subject to editing.

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SENATOR CARDIN VISITS GODDARD

Center Director Chris Scolese and U.S. Senator Ben Cardin of Maryland addressed Goddard on April 12, 2013 in the Building 8 Auditorium. The event was a town hall format with a question and answer period following Senator Cardin's comments.

U.S. Senator Ben Cardin (D-MD) is a member of the Senate Finance Committee and representative for nearly 300,000 federal civilian and military workers.

"I wouldn't trade our system with any other system in the world, but it doesn't look good now," Cardin said to more than 50 employees at Goddard.

On the forefront of attendees' minds was the sequester, the automatic federal budget cuts that took effect March 1, and how it is affecting Goddard and the agency as a whole. Many questions from audience members focused on the sequester.

Cardin stressed the need to support federal workers. "I understand Congress has a strange way of thanking you," Cardin said. "You have been asked to sacrifice time and time again," he said, "Enough's enough."

Members of local media were also in attendance. ■ Above: Sen. ben Cardin takes a question from a Goddard employee during the senator's visit on April 12. Photo credit: NASA/Goddard/Bill Hrybyk



ICE CLOUD HERALDS FALL AT TITAN'S SOUTH POLE

By: Elizabeth Zubritsky and Jia-Rui C. Cook

An ice cloud taking shape over Titan's south pole is the latest sign that the change of seasons is setting off a cascade of radical changes in the atmosphere of Saturn's largest moon. Made from an unknown ice, this type of cloud has long hung over Titan's north pole, where it is now fading, according to observations made by the Composite Infrared Spectrometer (CIRS) on NASA's Cassini spacecraft.

"We associate this particular kind of ice cloud with winter weather on Titan, and this is the first time we have detected it anywhere but the north pole," said the study's lead author, Donald E. Jennings, a CIRS Co-Investigator at Goddard.

The southern ice cloud, which shows up in the far infrared part of the light spectrum, is evidence that an important pattern of global air circulation on Titan has reversed direction. When Cassini first observed the circulation pattern, warm air from the southern hemisphere was rising high in the atmosphere and got transported to the cold north pole. There, the air cooled and sank down to lower layers of the atmosphere, where it formed ice clouds. A similar pattern, called a Hadley cell, carries warm, moist air from Earth's tropics to the cooler middle latitudes.

Based on modeling, scientists had long predicted a reversal of this circulation once Titan's north pole began to warm and its south pole began to cool. The official transition from winter to spring at Titan's north pole occurred in August 2009. But because each of the moon's seasons lasts about 7 ½ Earth years, researchers still didn't know exactly when this reversal would happen or how long it would take.

The first signs of the reversal came in data acquired in early 2012, which was shortly after the start of southern fall on Titan, when Cassini images and visual and infrared mapping spectrometer data revealed the presence of a high-altitude "haze hood" and a swirling polar vortex at the south pole. Both features have long been associated with the cold north pole. Later, Cassini scientists reported that infrared observations of Titan's winds and temperatures made by CIRS had provided definitive evidence of air sinking, rather than upwelling, at the south pole. By looking back through the data, the team narrowed down the change in circulation to within six months of the 2009 equinox.

Despite the new activity at the south pole, the southern ice cloud hadn't appeared yet. CIRS didn't detect it until about July 2012, a few months after the haze and vortex were spotted in the south, according to the study published in *Astrophysical Journal Letters* in December 2012.

"This lag makes sense, because first the new circulation pattern has to bring loads and loads of gases to the south pole. Then the air has to sink. The ices have to condense. And the pole has to be under enough shadow to protect the vapors that condense to form those ices," said Carrie Anderson, a CIRS team member and Cassini participating scientist at Goddard.

At first blush, the southern ice cloud seems to be building rapidly. The northern ice cloud, on the other hand, was present when Cassini first arrived and has been slowly fading the entire time the spacecraft has been observing it.

So far, the identity of the ice in these clouds has eluded scientists, though they have ruled out simple chemicals, such as methane, ethane and hydrogen cyanide, which are typically associated with Titan. One possibility is that species X, as some team members call the ice, could be a mixture of organic compounds.

"What's happening at Titan's poles has some analogy to Earth and to our ozone holes," said the CIRS Principal Investigator, Goddard's F. Michael Flasar. "And on Earth, the ices in the high polar clouds aren't just window dressing: They play a role in releasing the chlorine that destroys ozone. How this affects Titan chemistry is still unknown. So it's important to learn as much as we can about this phenomenon, wherever we find it."

The Cassini-Huygens mission is a cooperative project of NASA, the European Space Agency, and the Italian Space Agency. The mission is managed by JPL for NASA's Science Mission Directorate, Washington. The CIRS team is based at Goddard, where the instrument was built. ■

Opposite: The change of seasons on Titan is creating new cloud patterns at Titan's south pole. Here, a combination of red, green and blue images taken by the wide-angle camera on NASA's Cassini spacecraft shows a vortex over the south pole in natural color. A more recent ice cloud, detectable only at infrared wavelengths, also has formed over this pole. Image credit: NASA/JPL-Caltech/Space Science Institute/NASA Goddard

"So far, the identity of the ice in these clouds has eluded scientists."



INTERDEPENDENCE: 51ST GODDARD MEMORIAL SYMPOSIUM

By: Dewayne Washington and Mike Calabrese

Success Through Interdependence” was the theme of the American Astronautical Society’s (AAS) 51st Robert H. Goddard Memorial Symposium (RHGMS) held March 19-21, at the Marriott Hotel in Greenbelt, Md. For more than 50 years, senior representatives from NASA and leaders in aerospace policy have gathered at the RHGMS to review the status of space exploration and discuss challenges that might lie ahead.

This year’s challenges for the symposium included the influence of NASA-imposed travel restrictions for employees. “We were pleased with the outstanding content of our symposium and the very good attendance,” said Harley Thronson, chairperson of the RHGMS planning committee. “Especially in times that are challenged by the effects of budget uncertainties.”

NASA administrator Charlie Bolden opened the session by acknowledging the budget challenges and stressed an obligation to ensure America’s leadership in space exploration continues. He talked about having a crewed mission for an asteroid rendezvous by 2025 and a crewed mission orbiting Mars in the 2030s. “We will continue with the international operations of the ISS,” said Bolden, “and the development of Orion and development of the Space Launch System.”

The administrator also talked about the success of current NASA missions such as the Landsat Data Continuity Mission (LDCM) and the Global Precipitation Measurement mission (GPM). He spoke about the commercial space accomplishments with the SpaceX Dragon vehicle and the soon to be launched Orbital Sciences Corporation vehicle Antares.

Alan Ladwig, deputy associate administrator (AA) for Communications and Public Outreach, began the first panel discussion by taking a photo of the audience to Tweet. He spoke about how active NASA has become with connecting with the public using social media. During the discussion, Jaiwon Shin, AA Aeronautics Research, reminded the audience that, “NASA aeronautics (research) is with you when you fly.”

Panel members John Grunsfeld, AA Science and Greg Williams, DAA Human Exploration and Operations, spoke about NASA’s interdependence in science, human exploration and technology. Former astronaut Grunsfeld reviewed the NASA vision for continued robotic exploration of Mars that includes the 2016 InSight Rover mission and the Curiosity Twin Rover mission in 2020. Mike Gazarik, AA Space Technology talked about the three major technology focus for NASA: optical communication, solar sail propulsion, and navigation.

Chris Scolese, Goddard center director and Greg Robinson, deputy director of the Glenn Research Center, along with Robert Lightfoot, NASA AA, presented a panel discussion chaired by Frank Moring, senior editor, Aviation Week & Space Technology.

Their discussion focused on matching the needs of NASA headquarters and the centers’ capabilities while aligning with their resources. Scolese cited the need for a “sensible analysis” of tools and infrastructure required to build and launch missions. He talked about the cost of creating unique capabilities that are not used very often but necessary for space exploration.

Warren Ferster, *Space News* editor, chaired the panel discussion “Three Chiefs Plus One.” Gale Allen, NASA’s acting chief scientist, discussed the importance of internal and external interdependence in space science research. She led a discussion about budget challenges driving innovation and collaboration. NASA Chief Engineer Mike Ryschke-witsch spoke of the “just right” interaction between customer and contractor, and program and project management to achieve the optimum level of success within cost.

Opening the second day, Rebecca Spyke Keiser, associate deputy administrator for Strategy and Policy provided the keynote address. During her presentation, Keiser described the strategic planning process citing increased interdependence as the building blocks for NASA’s space program.

Balance, innovation and cooperation while bringing space into Earth’s economic sphere was the focus of a talk given by White House representative John Olson, assistant director, Space and Aeronautics. He closed his presentation noting an opportunity to further develop interdependence at the International Academy of Astronautics Summit of Heads of Space Agencies, January 2014 in Washington, D.C.

Michael Maloney, director of Space Studies for the National Research Council highlighted a finding in the 2012 study of NASA’s strategic direction, “There is little evidence that the current stated interim goal for NASA’s human spaceflight program—namely to visit an asteroid by 2025—has been widely accepted...by NASA’s own workforce.” He talked about lack of consensus undermining NASA’s ability to establish a direction that can guide program planning and budget allocation.

A final discussion about international influence focused on partner and customer interactions, team building, and interdependence to meet mission requirements. “International partnerships is an enabling feature, providing a ‘diversity of approach’ in science,” said Goddard chief scientist James Garvin. Quoting Antoine de Saint Exupery he said, “Your task is not to foresee the future but to enable it.”

Jim Cocker, vice president and general manager of Civil Space at Lockheed Martin Space Systems Company, provided the closing remarks for the symposium. He stated that with interdependence and partnerships, we achieve a vision. “Collectively, we can be greater than our individual efforts and that this is enabled by trust,” said Crocker. “The International Space Station is a great example of the fulfillment of this vision.” He closed with a reference to “Vision” in the Vincent Van Gogh “Starry Night” painting urging us to “Look at the stars and dream.”

Awards presented by AAS included the 2012 Randolph Lovelace II Award to Thomas Flatley; the Victor A. Prather Award to Jan Stepanek; the Military Astronautics Award to Maj. Gen. Todd Wolters, USAF; the International Cooperation Award to Dick Barnes; and the American Astronautical Society President’s Award to Jim Kirkpatrick, executive director of AAS.

Prepared remarks, power point graphics and videos of the presentations are available at the AAS [web site](#). ■

Above: Symposium chairperson Harley Thronson, AAS Executive Director Walter Faulconer, and Center Director Chris Scolese. Photo credit: NASA/Goddard/Bill Hrybyk



The 2013 Safety Awareness Campaign (SAC) is scheduled for April 22–26 for all Greenbelt employees. This annual event is designed to raise safety awareness and highlight best practices and lessons learned. This year’s theme, “Plug into Safety: Don’t be shocked by what you will learn!” serves as a reminder that everyone uses electricity and becoming complacent can lead to some serious consequences. The SAC also provides an opportunity for employees to learn strategies to incorporate safety principles while performing daily tasks at work and at home.

The 2013 SAC chairman Dan Simpson, along with a team of representatives from each Directorate, have worked diligently to offer a catalog of events to cover all aspects of safety at Goddard.

On Monday, April 22, at 1:00 p.m., NASA Astronaut Robert Curbeam, Jr. will open the 2013 SAC Kickoff with a presentation on “Spacewalking and Electrical Safety” in the Building 8 Auditorium. Mr. Curbeam will give us an inside look at his experiences during Discovery mission STS-116 where he performed the external rewiring on the International Space Station and worked on storing the malfunctioning Solar Array. Both of these operations required several special precautions to be put in place because they were operating with relatively high voltage DC systems while working in the pure oxygen environment of a spacesuit.

The 2013 SAC will incorporate a Directorate Safety Breakout, which allows management the opportunity to reiterate the goal of safety and conduct safety inspections through-

out their areas. Employees are encouraged to attend and will have an opportunity to ask questions and address any safety-related concerns. Please refer to the schedule to identify when your Directorate is listed to conduct their individual Safety Breakout.

Employees and supervisors will have the opportunity to participate in numerous courses and activities offered during the week of events. Several courses will be offered to assist in promoting health awareness, along with CPR/first aid certification. Courses to be presented include: electrical safety, identity theft, arc flash awareness, fire extinguisher training, hot work permit training, hazard communication training and numerous seminars on ergonomics.

As part of a continuing effort to ensure safety awareness and to implement policies and standards that ensure safe operations and mission success, Goddard senior management and the Goddard Safety Council are encouraging all employees to attend at least two activities during the SAC. All participants will be asked to provide feedback and suggestions that can be used in planning future Safety Awareness Campaigns.

If you have any questions or concerns, we encourage you to contact your Directorate SAC representative. For further details, visit the [Safety Awareness Campaign](#). ■

Above: Daniel Simpson, Chair, 2013 Safety Awareness Campaign Committee. Photo credit: NASA

PLUG INTO SAFETY: DON'T BE SHOCKED BY WHAT YOU WILL LEARN

By: Rob Gutro

WALLOPS RECOVERY CONTINUES FROM HURRICANE SANDY

By: Rob Gutro

Hurricane Sandy came ashore in northern New Jersey Oct. 29, 2012, and as the powerful storm made its way along the East Coast it brought damage to NASA's Wallops Flight Facility in Wallops Island, Va. The Wallops Shoreline Protection Project has been managing the restoration efforts and released before and after photos of the shoreline.

At 8 a.m. EDT on Oct. 29, 2012, the National Hurricane Center reported tropical-storm-force winds were occurring along the coasts of southern New Jersey, Delaware and eastern Virginia. Tropical-storm-force winds extended as far inland as the central and southern Chesapeake Bay as Hurricane Sandy closed in for landfall.

Hurricane Sandy removed about 700 feet of protective berm and about 20 percent of the beach protecting Wallops Island, home to NASA Wallops' launch pads and launch support facilities.

The beach, which had been recently improved under the Wallops Island Shoreline Protection Project, is vital to protecting the more than \$1 billion in NASA and governmental assets on Wallops Island from hazards such as hurricanes and nor'easters.

In addition to beach erosion, Hurricane Sandy caused minor roof, door and siding damage and downed trees throughout the facility.

NASA Wallops released three images showing the shoreline in 2011, in August 2012 following the completion of the Shoreline Protection Project, and in November 2012, showing the extent of the damages from the storm. The November 2012 photograph clearly shows extensive beach erosion. Wallops is now working to conduct an out-of-cycle beach replenishment and to repair the protective berm.



Goddard's Wallops Flight Facility (WFF) was established in 1945 by the National Advisory Committee for Aeronautics as a center for aeronautics research, and is now NASA's principal facility for managing and implementing suborbital research programs.

WFF is located in the northeastern portion of Accomack County, Va., on the Delmarva Peninsula, and is comprised of three land-masses: the Main Base, Wallops Mainland and Wallops Island. Wallops Island consists of approximately 1,680 hectares (4,600 acres), is bounded by Chincoteague Inlet to the north, Assawoman Island to the south, the Atlantic Ocean to the east and estuaries to the west.

For the complete NASA history, images and videos of Hurricane Sandy, visit NASA's Hurricane [web page](#). ■

Aerial photographs of the NASA Wallops facility and coastline. On the left is from August 2012 after completion of a Shoreline Protection Project. On the right is from November 2012 after Hurricane Sandy swept through. Photo credit: NASA

A BLOOMING PARTNERSHIP: BEHIND THE SCENES OF JAXA AND NASA MISSIONS

By: Rani Gran and Aries Keck



Approximately 60 of NASA's social media followers joined members of the media on Friday, April 12 at Goddard to learn about the many missions and partnerships between NASA and the Japan Aerospace Exploration Agency (JAXA).

Held on the Friday before the National Cherry Blossom Festival in Washington, D.C., the daylong Goddard event was designed to be a celebration of the many successful and ongoing missions between NASA and JAXA.

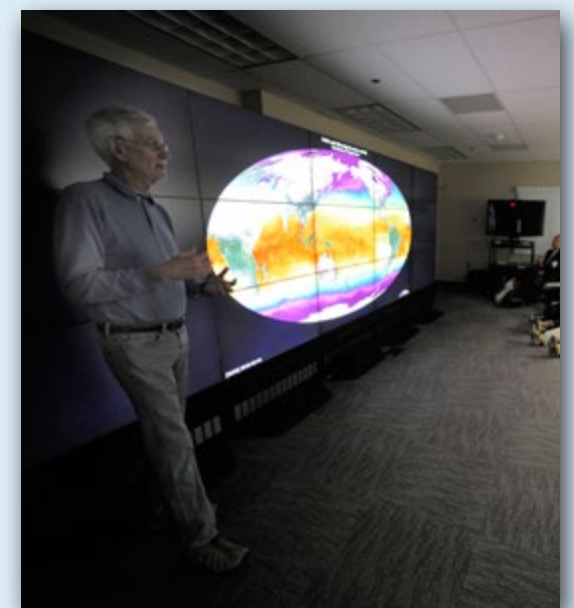
A highlight of this NASA Social was the discussion of the science and engineering involved in the Global Precipitation Measurement (GPM), an international mission to be launched by NASA and JAXA on a H-IIA Japanese-owned rocket from the Tanegashima Space Center in Japan in 2014. GPM will provide three-dimensional views of hurricanes and typhoons and set new standards for precipitation measurements worldwide using an international network of satellites united by the GPM Core Observatory, a satellite built by NASA and JAXA. The satellite is currently being tested at Goddard.

NASA Social participants had the opportunity to speak with JAXA and NASA scientists whose work is at the cutting edge of understanding rain and snow from space. Visitors also heard how engineers at Goddard and JAXA overcame the challenge of building, shipping, and testing the GPM satellite instruments that were built in two different countries and successfully withstood two natural disasters.

The social networkers got to tour some of Goddard's facilities, including the world's largest clean room, Goddard's 'Chamber of Horrors' where satellites are tested to withstand the rigors of spaceflight and view the GPM Core satellite as it's being tested, the 'robot arm room' where NASA's Robotic Refueling Mission facility recently constructed and successfully deployed a refueling demonstration on the International Space Station, and the Astrobiology Laboratory where scientists search for signs of life beyond Earth.

During their visit to Goddard, NASA Social followers got to meet fellow space enthusiasts who are active on social media and members of NASA's social media team. ■

Photo credit: NASA/Goddard/Pat Izzo



OUTSIDE GODDARD

By: Elizabeth M. Jarrell

SPIRIT IN THE FIRE

A chance meeting with an Inuit in Barrow, Alaska—who spoke about his studies at Haskell Indian Nations University (Haskell) in Lawrence, Kansas—forever changed electrical engineer Dr. Paul Racette's life. The meeting inspired Dr. Racette to seek a better understanding of the Native American philosophy and worldview. As a result, Racette opened his eyes and heart to raising consciousness by bridging the gap between the two.

Racette began by participating in the NASA Administrator's Fellowship Program (NAFP) from 2005—2007. The first year, Racette journeyed to Haskell, where he taught Native Americans math and a course he created called "Earth Exploration," which examined how both scientific and traditional knowledge explain the world. "In indigenous cultures, storytelling and mythology are central to understanding the world and our origin," says Racette. To help put space exploration in context for his Native American students, he invoked the writings of noted mythologist and author Joseph Campbell to emphasize that studying the Earth from space is a form of exploration and self-discovery.

He also studied the application of mathematical modeling he developed in radiometry, his primary field, as a means of bridging the gap between how Western and Native American cultures observe the world. "Models or beliefs form perspective that leads to outcome. Reference values are used to assign meaning to observations. The Native American approach is based more on relationships, as opposed to, for example, reductionism. A hypothesis-based scientific study may dissect a plant, map its genome and categorize it within a family tree. Native traditional approach would seek to understand the plant in relationship to its surroundings and environment," explains Racette.

While at Haskell, Racette also pursued consciousness studies. "I got a few raised eyebrows when my management learned that I wanted to 'go study consciousness with the Indians,'" recalls Racette. However, management supported him. "Consciousness, including individual and collective consciousness, is the phenomenon that links life's actions and reactions to physical reality. In its simplest sense, consciousness is what connects our lives to all other life in the universe," explains Racette.

The second year of his fellowship, Racette worked in NASA Headquarters' Office of Education, developing national partnerships for education. He also became a founding member of Goddard's Native American Advisory Committee. "There remains a thriving but not widely recognized Native American presence in Maryland and Virginia," says Racette. He has attended several powwows, which he describes as "a Native American spiritual celebration of life with lots of traditional dancing, singing, drumming, and eating."

In 2007, Racette co-founded www.Earthzine.org, an on-line magazine published by the Institute of Electrical and Electronics Engineers (IEEE), as an outreach activity for the intergovernmental Group on Earth Observation. Racette uses Earthzine to educate others about the social benefits of Earth observation leading to global awareness as well as to champion indigenous perspectives.

As editor-in-chief, Racette regularly contributes to the magazine. "We protect the life of our young as well as the spirit in the fire. To protect Life is to value and care for that which warms our heart during the cold night's torrent of rage against all life, Death...so that we may wake to a new dawn with all the splendor that Life has to offer," writes Racette in his July 25, 2010 post called "A Letter on Earth Observation and Global Awareness."

Racette often focuses on interrelationships giving meaning to existence. "The idea is that air is shared by all living, breathing entities and through that physical process we become related to each other. The message of indigenous cultures and traditions is you have to have reverence for that which gives you life," wrote Racette in an April 6, 2009 interview in which he quoted author Dr. Gregoy Cajete, a Tewa native.

Racette's life has changed greatly since that chance meeting with the Inuit from Haskell. "There are different ways of knowing and understanding the world and one's relationship to it," says Racette. He remains committed to raising consciousness by bridging how Native Americans and Western scientists view the world, especially in Earth observations. "My long-term aspiration is to establish a consciousness studies program within NASA," he concludes.

In June 2011, Racette received NASA's Equal Employment Opportunity Medal for "exceptional commitment, advocacy, and service" to Native Americans at Goddard and Tribal Communities across the United States. ■

Below: Racette (second from left) with students from Haskell. Photo provided by Paul Racette

